

## CLAIMS

We claim:

1. A composition suitable for improving gastrointestinal absorption and systemic utilization of nutritional materials, subsequent increase in nutrient induced thermogenesis, and increase in lean body mass, comprising at least one nutritional material in a nutritionally effective amount and a bioavailability enhancing effective amount of a bioavailability enhancer comprising at least 98% of the alkaloid piperine.

2. The composition of claim 1 wherein the piperine is obtained from an extract of fruits of the family Piperaceae.

3. The composition of claim 1 wherein the piperine is extracted from the fruit of piper nigrum or black pepper.

4. The composition of claim 1 wherein the piperine is extracted from the fruit of piper longum.

5. The composition of claim 1, which contains additionally an extract from the root zingiber officinale.

6. The composition of claim 1 wherein the nutritional materials comprise one or more members selected from the group consisting of herbal extracts, water soluble vitamins, fat soluble vitamins, amino acids, minerals, anti-oxidants, and combinations containing at least two of the nutritional materials.

7. The composition of claim 6 wherein the herbal extracts comprise one or more members selected from the group consisting of curcumin, boswellin, ashwagandha, ginkgo biloba, capsaicin, and aconitine.

8. The composition of claim 6 wherein the water soluble vitamins comprise one or more members selected from the group consisting of B1, B2, niacinamide, B6, B12, folic acid, and vitamin C.

9. The composition of claim 6 wherein the antioxidants comprise one or more members selected from the group consisting of vitamin A, vitamin C, vitamin E, alpha-carotene, transbeta-carotene, betacryptoxanthin, lycopene, lutein/zeaxanthin, pine bark bioflavonals complex, germanium, selenium, and zinc.

10. The composition of claim 6 wherein the amino acids comprise one or more members selected from the group consisting of lysine, isoleucine, leucine, threonine, valine, tryptophan, phenylalanine, methionine, and L-selenomethionine.

11. The composition of claim 6 wherein the minerals comprise one or more members selected from the group consisting of calcium, iron, zinc, vanadium, selenium, chromium, iodine, potassium, manganese, copper, and magnesium.

12. The composition of claim 1 which contains an extract from the fruit of piper nigrum, an extract from the fruit of piper longum, and an extract from the root of zingiber officinale.

13. The composition of claim 1, suitable for oral administration, in a unit dose form of 0.0004-0.15 mg/kg of body weight.

14. The composition of claim 1, suitable for topical or parenteral use, containing the unit dose of 0.00004-0.015 mg/kg of body weight.

15. ✓ A method for improving gastrointestinal absorption and systemic utilization of nutritional materials subsequent increase in nutrient induced thermogenesis, and increase in lean body mass; said method comprising administering a composition  
5 containing at least one nutritional material, a bioavailability enhancing effective amount of a bioavailability enhancer comprising at least 98% alkaloid piperine, to a subject in need of such treatment.

16. The method of claim 15 wherein the piperine is obtained from an extract from the fruits of the family Piperaceae.

17. The method of claim 16 wherein the piperine is extracted from the fruit of piper nigrum or black pepper.

18. The method of claim 16 wherein the piperine is extracted from the fruit of piper longum.

19. The method of claim 15, which contains additionally an extract from the root zingiber officinale.

20. The method of claim 15 wherein the nutritional materials comprise one or more members selected from the group consisting of herbal extracts, water soluble vitamins, fat soluble vitamins, amino acids, minerals, anti-oxidants, and combinations containing two or more of the above nutritional materials.

21. The method of claim 20 wherein the herbal extracts comprise one or more members selected from the group consisting of curcumin, boswellin, ashwagandha, ginkgo biloba, capsaicin, and aconitine.

22. The method of claim 20 wherein the water soluble vitamins comprise one or more members selected from the group consisting of B1, B2, niacinamide, B6, B12, folic acid, and vitamin C.

23. The method of claim 20 wherein the antioxidants comprise one or more members selected from the group consisting of vitamin A, vitamin C, vitamin E, alpha-carotene, transbeta-carotene, betacryptoxanthin, lycopene, lutein/zeaxanthin, pine bark bioflavonals complex, germanium, selenium, and zinc.

24. The method of claim 20 wherein the amino acids comprise one or more members selected from the group consisting of lysine, isoleucine, leucine, threonine, valine, tryptophan, phenylalanine, methionine, and L-selenomethionine.

25. The method of claim 20 wherein the minerals comprise one or more members selected from the group consisting of calcium, iron, zinc, vanadium, selenium, chromium, iodine, potassium, manganese, copper, and magnesium.

26. The method of claim 15 which contains an extract from the fruit of piper nigrum, extract from the fruit of piper lungum, and extract from the root of zingiber officinale.

27. The method of claim 15 wherein the composition is administered orally.

28. The method of claim 15 wherein the composition is administered topically or parenterally.

29. The method of claim 15 wherein the composition is administered topically.

30. The method of claim 16 wherein the composition is administered parenterally.

31. The method of claim 16 wherein the animal is a nonhuman animal.

32. The method of claim 16 wherein the animal is a mammal.

33. ✓ A method for the purification of piperine to greater than 98% comprising

- a) providing a source of piperine;
- b) adding the material of step a) to butanol and hexane;
- c) heat to 40° Celsius;
- d) cooling and filtering the material of step c);
- e) washing the precipitate with butanol/hexane mixture to obtain crude piperine;
- f) dissolving the material of step e) in methanol at 60° C;
- g) adding alumina and charcoal by stirring to the material of step f) and filtering; and
- h) concentrating the filter under vacuum.

34. The method of claim 33 wherein the source of piperine is oleoresin from black pepper or long pepper.

35. The method of claim 33 wherein the source of piperine is ground black pepper or long pepper.